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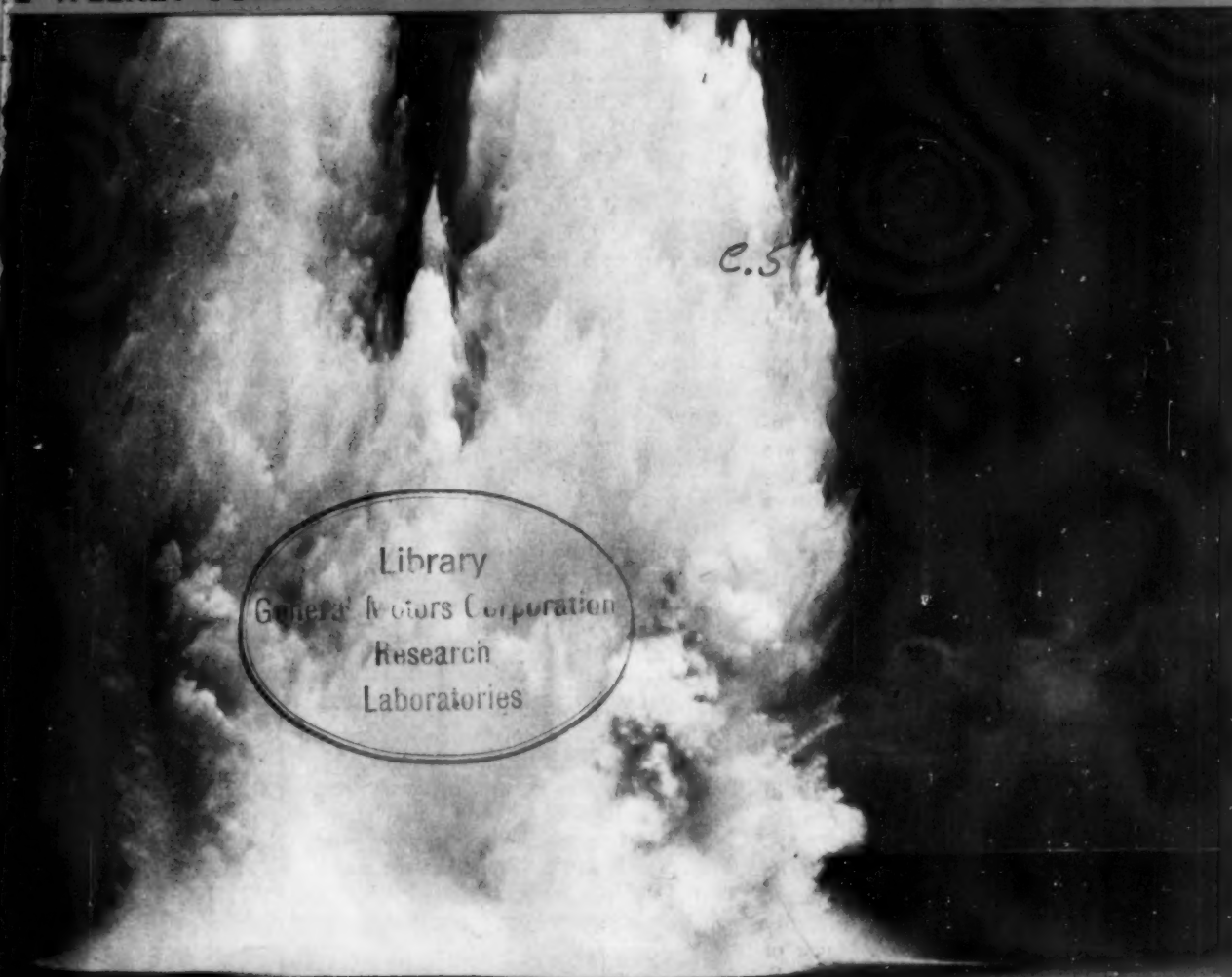
SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 4, 1946



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A SCIENCE SERVICE PUBLICATION

1921

TWENTY-FIFTH ANNIVERSARY

1946

GENERAL SCIENCE

National Academy Elects

Twenty-nine distinguished American men of science, two Foreign Associates have been elected to the National Academy of Sciences.

► RUSSIA'S best-known physicist, Dr. Peter Leonidovich Kapitza, noted for his researches on intense magnetic fields, was elected as one of two Foreign Associates at the spring meeting of the National Academy of Sciences. He is director of the Institute for Physical Problems of the Academy of Sciences of the USSR in Moscow.

The other new Foreign Associate of the Academy is a leading English mathematician, Dr. Sidney Chapman of the Imperial College of Sciences and Technology in London. Besides working in pure mathematics, Dr. Chapman has carried on researches in meteorology and terrestrial magnetism. During the war he was a scientific adviser to the British army.

Among the 29 American scientists who were elected to membership in the Academy are two directors of important industrial research laboratories. They are Dr. Elmer K. Bolton of the chemical department of E. I. duPont de Nemours and Company, and Dr. Chauncey Guy Suits of the General Electric research laboratory.

Two department heads in the Carnegie Institution of Washington were elected to Academy membership. They are Dr. Millislav Demerec, director of the Department of Genetics, and Dr. Merle Antony Tuve, director of the Department of Terrestrial Magnetism.

Chemists carried off the honors in number of new memberships. Among those elected are Prof. Rudolph J. Anderson of Yale University, Prof. Morris S. Karasch of the University of Chicago, Prof. Karl Paul Link of the University of Wisconsin, Prof. Joseph E. Mayer of Columbia University, Dr. Charles S. Piggott of the Carnegie Institution of Washington, Prof. George Scatchard of the Massachusetts Institute of Technology, Dr. Roger J. Williams of the University of Texas and Dean Frank C. Whitmore of Pennsylvania State College.

Physics is represented by Dr. Samuel K. Allison, director of the Institute for Nuclear Studies of the University of Chicago, and Prof. Kenneth T. Bainbridge of Harvard University.

Two geologists were made Academy

members: Dr. Wilnot Hyde Bradley and Dr. Wendell Phillips Woodring, both of the U.S. Geological Survey. A professor of a related science, seismology, Dr. Perry Byerly of the University of California, was also chosen.

New Academicians whose work is in the life sciences include Prof. Ernest B. Babcock, University of California; Prof. Marcus M. Rhoades, Columbia University; Prof. Tracy M. Sonneborn, Indiana University, and Prof. Chester H. Werkman of Iowa State College. There are two psychologists, Prof. Clarence H. Graham of Columbia University and Prof. Stanley S. Stevens of Harvard University.

Three research fields are represented by one new member each: Prof. Jesse Douglas of Brooklyn College, mathematician; Prof. Leslie Spier of the University of New Mexico, anthropologist, and Prof. Frederick E. Terman of Stanford University, engineer.

The medical sciences claim three of the newly elected members: Prof. Paul R. Cannon of the University of Chicago, Prof. Robert F. Loeb of Columbia University's College of Physicians and Surgeons, and Prof. Esmond Ray Long of the Henry Phipps Institute, University of Pennsylvania.

The Academy elected two new officers: Prof. D. W. Bronk of the University of Pennsylvania, who replaces the late Prof. W. B. Cannon as Foreign Secretary; and Prof. I. I. Rabi of Columbia University, Nobel Prizeman in Physics, who joins Prof. Bronk on the Council of the Academy.

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GENERAL SCIENCE

Newspaperman Awarded Medal by National Academy

► A SMALLTOWN newspaperman received one of the major prizes in the gift of American science, when Stuart H. Perry, editor and publisher of the *Adrian Telegram*, of Adrian, Mich., was handed the J. Lawrence Smith medal at the meeting of the National Academy of Sciences. The award was made in recognition of Mr. Perry's original researches on me-

teorites. This recognition of a non-professional's scientific work by the body that has sometimes been called the Senate of American science emphasizes anew the solid values that are often found in the scientific work of serious amateurs. It is an American tradition that dates back as far as Benjamin Franklin.

In all, five medals were presented at the meeting.

The Mary Clark Thompson medal was given to Dr. T. Wayland Vaughan of Washington, D. C., former director of the Scripps Institution of Oceanography, "in recognition of his outstanding achievement in such purposeful and ingenious coordination of observations and generalizations made in and bearing on the fields of stratigraphic geology and paleontology."

The Henry Draper medal, awarded for investigations in astronomical physics, was presented to Dr. Paul Willard Merrill, of the staff of the Mt. Wilson Observatory, for numerous important contributions, in particular those on stellar spectroscopy.

Two of the medals were in recognition of important published works. These were awards of the Daniel Giraud Elliot medal. One went to Sir D'Arcy Wentworth Thompson, of St. Andrews University in Scotland, for his book, "On Growth and Form." The other was presented to Prof. Karl Spencer Lashley of the Yerkes Laboratories of Primate Biology at Orange Park, Fla., in recognition of the merits of a paper entitled "Studies of Cerebral Function in Learning," published in the *Journal of Comparative Neurology*.

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PHYSICS

Passageway Opened For Bikini Atom Test

See Front Cover

► THE ATOMIC BOMB will not be dropped at Bikini until July, but the tropical quiet of that Marshall Islands atoll has already been rocked by lesser blasts.

The explosion, shown in the Joint-Army-Navy Task Force photograph on the front cover of this SCIENCE NEWS LETTER, knocked out a coral head just off shore to open a passageway into the beach for a boat landing.

Techniques used by the Seabees assigned to Joint-Army-Navy Task Force One were developed by them during the Pacific war.

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PHYSICS

Atomic Powered Navy

Program for developing propulsion of ships, submarines and aircraft by nuclear energy, with civilian commission, is planned by Navy.

► A NAVY powered by atomic energy as well as fighting with atomic weapons is visualized by Rear Admr. Harold G. Bowen, chief of the Navy's Office of Research and Inventions.

A vigorous research program for developing the propulsion of ships, submarines and aircraft by nuclear energy is planned by the Navy under the general guidance of a civilian atomic energy commission.

Admiral Bowen, speaking before the Engineers' Club of Philadelphia, declared:

"The prospects of harnessing atomic energy for the purpose of driving ships in the near future is an amazing possibility."

"If we start with a large vessel," Admr. Bowen said, "we will find that the elimination of the boilers and associated auxiliaries, as well as thousands of tons of fuel oil, offers the possibility of more advantageously disposing of weight. The application of this principle to commercial carriers is obvious. The bottoms of ships can be materially strengthened by using thicker plate, the whole hull structure can be materially strengthened, and armor can be more generally used, all with the idea of making ships less vulnerable to attack by atomic or other forms of bombing."

"Since economy of fuel will no longer be essential, turbines will be completely

redesigned, with the whole idea of increasing the amount of horsepower per pound of turbine as much as possible. With resulting greatly increased speeds, there will follow a complete redesign of the underwater body. Marked increases in speed will be conducive to reducing the possibility of effective bombings, etc.

"We will be searching for an ideal coolant for the atomic pile which will be, we hope, fluid from room temperature to 1500 or 2000 degrees Fahrenheit, and not capable of becoming radioactive. The design of the necessary heat exchangers will furnish a fascinating problem to those who are versed in the art of heat exchange."

Admr. Bowen also listed five other problems in atomic energy that are Navy responsibilities:

"The development of nuclear munitions, and the vehicles to launch and carry them;

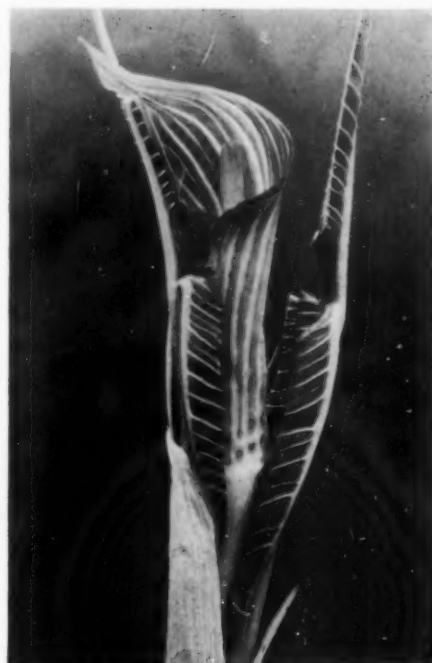
"The utilization of nuclear studies for the medical sciences;

"The exhaustive exploration of all possible countermeasures to nuclear munitions and their carriers;

"The maintenance of a broad program of research in nuclear physics and the allied fields of science; and

"The education and training of naval personnel in nuclear energy and its applications."

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SPRING BANNERS—New leaves are sometimes called by poets "the banners of spring." Here we see the banners unfurling. When Jack-in-the-pulpit prepares to bloom, a tall spike pushes its way up. Within, tightly rolled, are the curious floral structure of this plant and a pair of leaves. Nature photographer Lynwood M. Chase, New Bedford, Mass., has here caught the moment when the flower has partly opened, but the leaves are still close-rolled.

CHEMISTRY

DDT's Future Questioned

War-born "Ersatz", it proved better than insecticides it replaced but may in turn be replaced by other chemically related compounds now made in small quantities.

► DDT, now hailed as man's best weapon in the never-ending war against insect pests, isn't here because it was wanted in the first place. It was developed as a wartime "Ersatz" insecticide, to pinch-hit for old favorites like pyrethrum and rotenone when supplies of these were cut off or made inadequate by the war—and it surprised even the scientists who worked with it by being

a more effective insect-killer than the ones it replaced.

At the meeting of the National Academy of Sciences, Dr. H. L. Haller of the U. S. Department of Agriculture told the story of DDT up to now, and gave glimpses into its possible future. One quite possible future for DDT may be that it may not have any. That is, Dr. Haller explained, it may be replaced by

other chemically related compounds now being made in small quantities and tested, some of which may well prove to be even deadlier to insects than the parent compound, and at the same time less poisonous to larger and more desirable animals that swallow it incidentally or accidentally.

Discovery of DDT's value made life easier for chemical searchers for synthetic insecticides by demonstrating conclusively that to be an effective insecticide a compound does not need to be complex, with big, hard-to-synthesize molecules, like rotenone, pyrethrum and nicotine. Nicotine has been made synthetically, though it still remains cheaper and more practical to extract it from tobacco. Rotenone and pyrethrum have not been synthesized at all, and now it appears unnecessary to attempt the task. DDT has a small, relatively simple molecule, and the new British insect-killer, benzene hexachloride or 666, has a mole-

cule even smaller and simpler in structure.

With successes like these to start on, chemists are making modified molecules of the same general pattern—for example, substituting fluorine for some of the chlorine atoms in DDT, with interesting-looking results in the tests. It may be that we shall have an analogue for the history of the sulfa drugs; at first there was only sulfanilamide, but after a while

the sulfa compounds could be counted by the dozens, and from being expected to lick all the bacteria in sight, sulfanilamide presently became assigned to a narrower sector where its work was really effective. Some years hence, the now almost-universal insecticide, DDT, may be only one weapon in the entomologist's armory, with many more of the same general class ready for special missions on the hexapod front.

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ELECTRONICS

Fog Turned to Rain

Siren blasts clear landing fields. Inaudible, high-frequency sound waves, without unpleasant effect of sirens, to be tested.

► SOUND WAVES that convert fog into rain may be used instead of wartime flame vaporizing systems to keep future landing fields clear for aircraft, according to officials at the Navy's Landing Aids Experiment Station at Arcata, Calif.

Successfully tested against fog, the first sound system used a battery of sirens whose blasts not only bombarded particles of fog into rain but also nauseated personnel on the airfield.

For the future, a new system to be tested this summer will send out ultra-sonic waves that are inaudible to human ears. Transmitting vibrations at 20,000 to 40,000 cycles per second, the equipment is expected to operate as effectively against fog as the sirens but without the unpleasant effects of the latter.

During the war, the British pioneered in FIDO, fog investigation and dispersal operations, and they developed the important Haigill system, that permitted Allied aircraft to land at bases in Britain in severe fogs. The principle used is that of vaporizing the fog by intense heat from controlled fires lining landing strip runways.

Disadvantages of Haigill include the high cost, as much as \$4,000 or \$5,000 to land one plane with high-octane gas as the fuel for flames. Although this cost was small compared with the lives and equipment saved during the war, intensive research has gone into modifications of the system.

Probably the best thermal installation for clearing fog from airports is the one scheduled for the test at Arcata during the next two months. Known by the code name ELMER, this vaporizer can reduce fuel costs for a landing to as little

as \$150. ELMER can burn gasoline, kerosene or diesel oil and has an atomizing nozzle with electrical heating elements for igniting it instantly. Haigill systems burned more expensive fuel and required 10 minutes of "warm-up" for effective operation.

While the Navy experimented with ELMER, it also started an investigation of sonic fog clearing. The first tests worked well against the fog but created new problems.

A battery of 12 powerful air raid-type sirens with 24-foot wooden amplifying horns blasted a heavy fog over the experiment station with enough force to merge the fog particles into raindrops that fell to earth, clearing the overcast above the landing field. Personnel on the field had cotton in their ears, with a sponge rubber covering over the outside. They reported no ear trouble, but most of them became nauseated from the intense sound.

The powerful sirens also proved to be more effective than a hunter's horn, as several birds were blasted out of the sky by the noise.

Now, experts at the Navy's Landing Aids Experiment Station believe that the answer is in the use of ultra-sonic transmitters sending out waves at such high frequencies that men and animals won't be able to hear them.

Two problems that sonic engineers hope to answer with full-scale experiments this summer are the possible effects of the sound blasts on personnel in planes and the danger of damaging aircraft by the powerful waves.

If the tests are successful, Navy officers believe that high-frequency sound systems will be more practical than

thermal fog dispersal. A sonic system would have approximately the same initial cost as flame installations and could be operated more economically. For Naval use, the sound system may be developed for aircraft carriers. Now being investigated, sonic installations on carriers would enable the big ships to improve their own weather under adverse flying conditions.

A third fog-clearing system tested here used a huge blower to throw curtains of hot air at right angles to the wind. Causing the wind to move in a vertical circle, this wave of hot air consequently dispersed the fog.

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MEDICINE

Penicillin and Syphilis

It is the best and safest treatment for the disease. There is no need for alarm over relative inefficiency of one kind of the drug.

► **PENICILLIN** is the best and safest treatment for syphilis yet devised. Patients who have been treated with it during the past several years and their doctors need not be alarmed by reports of its being ineffective, the syphilis study section of the U. S. Public Health Service declared in a statement.

Military secrecy necessary during the war was responsible for some of the confusion over penicillin and its effectiveness in treating syphilis. During the war only a very few persons were allowed to know anything about the chemical studies of penicillin. Those studies revealed the fact that there are at least four kinds of penicillin, called G, X, K and F in this country.

Manufacturers, meanwhile, were producing penicillin as fast as they could and were trying, quite laudably, to make their product as pure as possible. In the course of these efforts to get more and purer penicillin, they began getting and marketing penicillin containing substantial amounts of penicillin K.

Penicillin K, Dr. Alan Chesney of Johns Hopkins Medical School announced in mid-February of this year, is completely ineffective in treatment of syphilis in rabbits.

That bombshell startled scientists and manufacturers. A meeting was called. Immediately after, manufacturers began taking steps to decrease the amount of penicillin K in their products.

Dr. Chesney's studies were made with pure penicillin K. Commercial penicillin, however, has not consisted of pure K. So patients treated with the commercial product, even since 1944 when K was predominant in some of the penicillins marketed, probably got some of the other kinds as well as K. They may relapse or they may not. If they relapse, they can be treated again.

They are in no more danger of getting paresis, or syphilis of the brain, than if they had been treated by any other method, Dr. Joseph Earle Moore, of Johns Hopkins Medical School and chairman of the syphilis study section of the U. S. Public Health Service, declared in discussing the situation at the National Academy of Sciences meeting.

Less than one in a hundred are in danger of getting paresis, he said.

Every patient with syphilis should return for retesting at regular intervals throughout his life, no matter what treatment he has had, Dr. Moore continued.

Patients treated at the U. S. Public Health Service rapid treatment centers are routinely asked to return for retesting. This has nothing to do with whether or not they were treated with penicillin. If on retesting it is found that any have relapsed, they will be retreated.

Larger doses of penicillin given at more frequent intervals are suggested by Dr. Moore as one way doctors can be sure they are getting enough of the drug at present while there is any question of its containing much of the relatively ineffective penicillin K.

Penicillin K, he said, is one-tenth as effective as penicillin G in syphilis. It is one-sixth as effective as G in treating pneumonia in mice and one-fourth as active as G in treating streptococcus infection in mice. Patients with these acute infections, however, are not in any danger of not getting enough penicillin to get them well.

The reason penicillin K is less effective than the other varieties is that it is more rapidly destroyed in the body.

Resistance to penicillin which some disease germs have developed and the difficulty in curing subacute bacterial endocarditis, a chronic heart ailment, with penicillin may both be due to the increased amounts of K in penicillin since 1944, Dr. Moore said.

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SOCIOLOGY

Atoms May Revolutionize World Social Order

► **LIVING** with atomic energy in peacetime may be as revolutionary to world society as the first nuclear fission bomb explosion was to warfare, a University of Chicago sociologist declared.

If we do succeed in outlawing war, Dr. Louis Wirth told the Illinois Association for Applied Psychology that social implications of peaceful atomic

energy may be just as powerful, if not so destructive, as the new bombs were.

He said that atomic energy used as power could change the pattern of agriculture and industry in the world by making possible the development of outlying virgin areas of the earth. This could either raise the world's standard of living or at least more nearly equalize it, the sociologist asserted.

With atomic energy to serve them, men would have much shorter working hours, he predicted.

"We can only contemplate vaguely," Dr. Wirth warned, "what problems will be created when the masses of men will be emancipated from drudgery and will have at their disposal the leisure of which the Utopians have dreamed."

Social benefits from the peaceful atomic age forecast by the sociologist include a closer world with new institutions of human collaboration and the end of insecurity, prejudice and bigotry.

He warned against defensive measures in the future, asserting that efforts to disperse cities or build industry underground are "measures of short-sighted desperation."

"Most important of all in our neglect of the social implications of atomic energy development," he charged, "is the fact that unless the military use of it is controlled, there may not be a civilization with problems of adjustment."

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AERONAUTICS

Carrier-Based Planes Helped To Steer Vessels

► **WHEN COMBAT** planes do ordinary stunts in the air, it is not news. But when Navy carrier-based planes helped to steer their mother-ship, it is something different. It works when the vessel is traveling at low speeds in narrow waters.

Two rows of planes were lined up facing each other along the forward part of the flight deck, and firmly anchored in position. By turning up to full speed propellers of the airplanes in the left row at the same time, the bow of the vessel was swung to the right. The other row swings it to the left. The tugboat has a rival.

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Calcium is the mineral element most likely to be lacking in the American diet.

Clothes in a storage closet can be freshened up by using an electric fan for an hour a week to change the air; in summer the process discourages moths.

TECHNOLOGY

Cheaper Active Carbon

A simple process by which active carbon may be manufactured from anthracite may now be achieved, recent investigations indicate.

► **ACTIVE CARBON**, widely used as an adsorber of gas impurities in air and of color and odor in water, may some day be obtained cheaply from anthracite coal, recent investigations at State College, Pa., indicate. Obtaining active carbon from anthracite is not new, but a simple process by which it can be manufactured cheaply, one object of the investigation, may now be achieved. The raw material is plentiful, the process not costly. It is a direct activation by selective oxidation with steam.

During World War I, anthracite was steam-activated on a commercial basis to yield the coal carbon, a moderately good gasmask carbon when compared with good carbons made from coconut shells. Later, steam-activated unbriquetted anthracites were prepared that were equal or superior to the coal carbon in activity; yet, it appeared that anthracite, generally, had never been raised to the highest activity possible commensurate with the weight loss during activation and the

ash content of the activated material.

In the present work, carried out at the Pennsylvania State College by three members of the staff, J. D. Clendenin, W. T. Griffiths and C. C. Wright, the activation characteristics of several different anthracites, and of three specific gravity fractions of one anthracite, were examined by subjecting the coals to steam activation in a stainless steel retort. The different anthracites were high, medium and low-volatile types.

In general, the approximate yield of active carbon from the three coals was about triple the yield from commercial coconut shell, but the adsorption power was less. A hundred pounds of the active carbon from the medium volatile coal adsorbed 50 pounds of carbon tetrachloride, the high-volatile product slightly less and the low-volatile coal carbon 38 pounds of the compound. Commercial coconut shell active carbon adsorbed 68% of its own weight in carbon tetrachloride.

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CHEMISTRY

Synthetic Rubber Theory

Secret war process that shows how it is formed from oils agitated in soapy water described to National Academy by Dr. Harkins.

► **A WAR SECRET** theory that explains how synthetic rubber is formed from chemicals agitated in a soap solution similar to that on soapy hands was revealed to the National Academy of Sciences by Prof. William D. Harkins, University of Chicago chemist.

Differing from German theories which Prof. Harkins terms "naive", the theory developed in 1942-3 has molecules of the butadiene-styrene oil mixture standing upright like soldiers on parade upon the water surface between layers of soap molecules. In these oil layers very short single "monomer" molecules grow into much longer molecules, sometimes 1,000 to 15,000 joining to make one single long chain polymer molecule. When the long molecules coil up and become too thick

to be held between the soap molecules they are ejected as rubber particles, many of them as small as a third of a millionth of an inch in diameter. Almost all the rubber produced in the United States grows in these minute spheres.

Since the manufacture of synthetic rubber was one of the major industrial tasks of the war, Prof. Harkins spent three years under the auspices of the Office of Rubber Reserve in a thorough test of this fundamental theory.

The rubber growth theory applies equally well to the manufacture of many other plastics.

Prof. Harkins presented startling facts about what happens in the submicroscopic chemical world:

Soap solutions dissolve oils in ex-

tremely thin layers and this gives the oil an extremely large area: ten acres per cubic inch of oil.

The thinness and large area cause the rubber particles formed to be so small that a cubic inch of oil forms 200 billion of these small spheres.

Each of us produces these oil layers whenever we wash our hands with soap.

The theory of orientation of molecules upon surfaces, developed about 30 years ago by Dr. Harkins, Dr. A. C. Langmuir of the General Electric Company and the British scientist, Hardy, has "revolutionized not only one of the branches of chemistry, but is also having a profound influence in biology."

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CHEMISTRY

Latest Antibiotic Comes From Wild Ginger

► **GRANDMOTHERS** and great-grandmothers who dosed the family with wild ginger tea had something, it now appears.

The latest antibiotic, or penicillin type of anti-germ disease remedy, to be announced comes from wild ginger, technically known as *Asarum canadense*.

The discovery of two antibiotics produced by this plant was made by Dr. C. J. Cavallito and Dr. John Hays Bailey of the Winthrop Chemical Company research laboratories at Rensselaer, N. Y.

One of the wild ginger antibiotics, labelled A, is a colorless compound active against pus-forming germs. Staphylococci, streptococci and pneumonia germs are affected by it. The other antibiotic, called B, is a lemon-yellow acid with less anti-germ activity.

The anti-biotics in wild ginger were discovered in the course of a search for such agents in higher plants. So far about 200 local New York State plants have been screened. Of these, garlic and burdock have also been found to produce antibiotics.

Wild ginger is abundant in woods from New Brunswick to Manitoba in Canada and as far south as North Carolina, Missouri and Kansas. Other popular names for it are false coltsfoot, asarabaca, Canadian snakeroot and colic root.

Although 98% of the old-fashioned home remedies that made use of plants and herbs may have been merely harmless, Dr. Cavallito is quoted as now viewing the home remedies with "a less sneering attitude than formerly."

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CHEMISTRY

New Dehydrating Process

Retains qualities of fresh food. Quick-drying "anhydrated" food will be put on the market next fall, Clarence Birdseye says.

► ANHYDRATED foods, produced by a new quick-drying method, will be tested on the market this fall, according to the inventor of the process, Clarence Birdseye, Gloucester, Mass., who revealed details of the new system of dehydrating foods to the spring meeting of the American Society of Mechanical Engineers in Chattanooga, Tenn.

Declaring that fruits and vegetables treated by anhydration are "in every way as acceptable as if quick-frozen or freshly harvested," Mr. Birdseye said that preliminary experiments have shown that the process may be used for a wide variety of products such as grains, synthetic rubber and resins, soap flakes and certain wood products, in addition to fruits and vegetables.

He reported that the damage done to food in present tunnel dehydration is caused by the relatively long periods of heating. While the final drying process in the present method may require as much as 18 hours, Mr. Birdseye said that his new apparatus will reduce the moisture content of shredded cabbage from 94% to 3% in one hour and 25 minutes.

Anhydrated foods may be rehydrated and cooked in from 7 to 20 minutes, he reported.

During the war, Mr. Birdseye, a pioneer in the development of concentrated foods, said that U. S. production of dehydrated food increased from 20,000,000 pounds annually to 200,000,000 pounds in 1944, most of the latter going to the Armed Forces.

The processed food for the services was produced by tunnel drying using hot air currents as the sole method of dehydration. In anhydrating, radiators serve to both shed infra-red energy on the product and transmit heat to the current of dehydrating gas passing through the new tunnel in which the food is treated.

Carried through the tunnel on a belt, the food is also dried by heat from radiators on the floor, while the belt itself is made of a heat-conductive material.

Food in the anhydrating tunnel is stirred by tedders over the belt, and hot air currents are played on the food at a high enough velocity to help stir the food being dried.

Anhydrators now under construction will have a capacity from 2,000 to 3,000 pounds of water evaporation per hour, Mr. Birdseye said, while simple changes will permit use of direct combustion gases instead of steam for heating.

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TECHNOLOGY

Industries Asked to Probe German Technology

► IF ANY INDUSTRY or scientific group wishes to investigate German industrial methods, Uncle Sam will make the necessary arrangements for a mission to go to Germany.

There is one proviso: The investigation must promise to be of value to U. S. industry as a whole, in the opinion of the Department of Com-

merce's Office of the Publication Board.

Teams of experts drawn from industry went into Germany not far behind the troops, and as a result tons of technical documents were amassed. Many of the reports of these numerous expert teams are now being issued by the Department of Commerce in both full-size and microfilm forms.

The Commerce and War Departments are now about to begin selecting from this accumulation what more is worth making available to American industry.

The Department of Commerce statement declares that these documents contain "priceless information." Investigators have already found many new formulas, products and processes which, it is declared, American industry is already beginning to use.

Industry's help in recruiting qualified technicians to search the captured German files is being requested. Technical men with a knowledge of technical German are needed who are familiar with chemicals, aeronautics, automotive industry, machine tools, industrial equipment, fuels and lubricants, metals and minerals, communications equipment, scientific instruments, shipbuilding and textiles.

Science News Letter, May 4, 1946



RARE COMBINATION—Only one birth in three million in the United States is of albino identical twins, state Dr. David C. Rife, M.D., Schonfeld and Marilyn Hunstead of Ohio State University. They base this estimate on the fact that only one person in ten thousand is an albino, and about one birth in three hundred is of identical twins. These two men are strikingly similar in voice, mannerisms and observed personality traits. Like other albinos their vision is poor. They have three brothers and three sisters. Two of the brothers are also albinos, but the other brother and all of the sisters have normal coloring. The parents also have normal pigmentation, the geneticists state in the *Journal of Heredity*.

VETERINARY MEDICINE

Penicillin Cures Dairy Cattle Disease

► **PENICILLIN** has more curative power than any other tested drug for common mastitis, the most prevalent disease among dairy cattle.

Used in three large doses of 50,000 units each, at 24-hour intervals, penicillin cured 92%, in University of Wisconsin tests. Single large doses cured about half the cases, and more where the infection was not serious or of long standing.

The drug proved generally helpful for dry and milking cows, causing little irritation, and had no apparent effect on milk production. It was more valuable in chronic cases than in acute flareups.

The tests were conducted upon mastitis caused by a streptococcus, which is the most common form. The veterinary scientists at the University of Wisconsin stated that other forms of the disease may respond better to sulfa drugs than to penicillin. Dairy men were advised to rely on a veterinarian's diagnosis.

With cows of average value it will often be practical to try first a single treatment with 50,000 units. If that fails, and the animal is valuable enough, a series of treatments can be used, administering three treatments of 50,000 units each at 24-hour intervals.

The University scientists emphasized, however, that drugs can only cure, and will not prevent the disease or reinfection with it, thereby making it as important as ever to hold mastitis to a minimum by practicing strict sanitation.

Science News Letter, May 4, 1946

GEOPHYSICS

Oil Search in New Deep Sea Diving Bell

► A **NEW** diving bell will permit scientists to descend 250 feet into coastal waters carrying gravity meters to search for new off-shore oil deposits. Eugene Frowe, of the Robert H. Ray Co., Houston, Tex., has reported this to the Society of Exploration Geophysicists.

Gravity meters are used extensively for land prospecting to detect sub-surface structural changes that tell where oil is likely to be found. They have not been successful under water because of boat motions and ocean currents. The new diving bell will give the instrument the same stability under the sea surface down to 250 feet as it would have on land.

Fifty inches high and 60 inches in diameter, the bell has two concentric

cylinders with water ballast separating them. It uses two air lines, one for breathing and one for regulating the ballast, and is designed to be lowered and raised from a crane mounted on a barge.

Both air lines can be used for ventilation as a safety measure, while a device is provided for automatically blowing the water out from between the cylinders in event of a power failure. An additional safety feature is an escape lung similar to those used on submarines.

Science News Letter, May 4, 1946

PUBLIC HEALTH

Better Protection of Workers Against Silicosis

► **BETTER PROTECTION** of workers in certain industries from the hazard of silicosis appears likely as a result of a new method of sorting the dust in air developed by the Industrial Hygiene Foundation at Mellon Institute, Pittsburgh.

Silica particles so fine that more than 100 million can be piled on the head of a pin can now with the new method be sorted out of larger dust in factory air, Dr. Francis R. Holden, of the Foundation, said in reporting the new development at the meeting of the American Industrial Hygiene Association in Chicago.

The finer the silica dust, Dr. Holden continued, the greater the danger, because only microscopic particles smaller than five microns are likely to damage the deep lungs. Particles larger than five microns, which is about the size of a red blood cell, are more readily trapped in the filter mechanism of the nose and throat.

Dr. Holden described the collecting, counting and analysis of dust in the dangerous size ranges as follows:

"Visible and invisible dust in the workplace is determined by condensing dust floating in atmosphere equivalent in size to a small room, into a capsule-sized sample. This is done by drawing a measured volume of air through a powdery substance (salicylic acid). The substance is then dissolved in alcohol and the dust sample remains."

Through a process of sedimentation the total dust sample is divided into particle sizes above and below five microns. After the smaller particles have been counted and analyzed by X-ray, the chemist can now determine the degree of a silica hazard with greater accuracy than formerly.

Science News Letter, May 4, 1946

IN SCIENCE

ENGINEERING

Dwelling Houses Quickly Built of Vacuum Concrete

► **BY SUCKING** water and air out of concrete, dwelling houses of this non-critical material may be more quickly constructed. The process involves the use of a vacuum to cause concrete to harden rapidly, and a mechanical lifter which raises precast sidewalls into position without danger of damage.

The vacuum concrete process is not new; it has been in use for about eight years. The details of the process, however, have been pretty well confined within the trade. The mechanical lifter is new; with it, entire sidewalls, precast in horizontal forms lying on the earth, can be handled quickly and easily.

The vacuum process, by means of plywood mats under which a vacuum is created by a vacuum pump, removes the water in the plastic mixture that is not needed to hydrate the cement. It removes entrapped air also. This permits the concrete to shrink as it hardens. In the process, suction alone is not used. With it is combined pressure to compact the material. This pressure is an integral part of the process, and it approximates 1,500 pounds per square foot.

Science News Letter, May 4, 1946

ELECTRONICS

Radar Used Successfully Against Ground Targets

► **RADAR EQUIPMENT** intended primarily for use against enemy aircraft proved highly useful in fighting on the ground, it is revealed in the *Coast Artillery Journal* (March-April).

Early in the development of radar, it was discovered that it could detect and track shells fired from mortars and field artillery pieces. This knowledge was put to good use in finding well-concealed enemy batteries. American shells sent back along the same courses silenced the batteries.

It was also found possible to detect and track enemy tanks, mobile guns and even moving bodies of troops. To do this, it was necessary to modify the radar so that it would filter out echoes from stationary objects and register only the echoes from things that moved.

Science News Letter, May 4, 1946

SCIENCE FIELDS

PHYSICS

Additional Weather Data From New Sound "Radar"

► A NEW WAY of probing the atmosphere immediately above our heads for weather predicting data by bouncing sound echoes was announced to the American Physical Society by two Bell Telephone Laboratories physicists, G. W. Gilman and F. H. Willis.

This acoustic "radar" detects large changes in temperature overhead by the fact that the amount of sound returned is increased several times in volume when hot and cold air are intermingling violently. Such an atmospheric condition occurs when there is what is called a cold or warm front, likely to be accompanied by storm.

The new device, christened "sodar", launches vertically upward from the ground a sound of low-power that is in range of human hearing. The echoes are received and changed into oscilloscope patterns that can be viewed visually.

Since the behavior of microwave radio signals as well as many weather phenomena depend upon the distribution of temperature, humidity and air movement in the atmosphere, sodar promises to be important in forecasting radio conditions in the future.

Science News Letter, May 4, 1946

GEOLOGY

Mississippi River's "Grand Canyon" Discovered

► A CANYON five miles wide with walls more than 600 feet high has been discovered along the lower Mississippi river by oil prospectors. You can not "see" it without a seismograph for studying the geological structure of the area.

The Mississippi's "Grand Canyon" was described by Walter J. Osterhoudt of the Gulf Research and Development Co.

Geologists have known for some time that there should be a canyon on the lower part of the "Father of Waters," but where it was or what had happened to it was one of the principal unsolved problems of submarine geology.

The answer, discovered by oil prospecting parties in the Mississippi delta region, is that the canyon is still there, but

it has been filled in with sand and mud.

The huge canyon, cut by the river within recent geological history, was first spotted by seismograph readings in the region south of Timbalier Bay in Louisiana that revealed a sharp deepening beneath the surface of the delta. This underground structure proved to be the east bank of the missing canyon.

Further tests revealed evidence of the canyon at three other points near the present river channel from Houma, La., to the Gulf of Mexico.

The Mississippi was once so much more powerful than it is today that it could scour the deep channel far below sea level.

Science News Letter, May 4, 1946

NUTRITION

Yeast Eaters Missed Out On Vitamins, Study Shows

► THOSE PERSONS who regularly ate one or more squares of fresh baker's yeast daily with the idea of supplying themselves with extra amounts of B vitamins missed out, University of Wisconsin scientists report.

The yeast eaters not only failed to get extra amounts of B vitamins but may even have lost some of the vitamins they had gotten from other foods.

Yeast was promoted as a good source of vitamins because of its high content of them. The living cells of fresh baker's yeast, however, hang on to their thiamin and riboflavin so the yeast eater does not get any of these vitamins, Drs. Helen T. Noss, Echo L. Price and Helen T. Parsons have found. The living yeast cells, moreover, probably take some of the thiamin released from other food.

These new findings will be reflected in changes in the labels of compressed yeast, or fresh baker's yeast, if the labels have not already been changed.

If the yeast is killed by boiling or by a commercial process in preparing dried yeast, it becomes a good source of thiamin and riboflavin for human nutrition.

Carp and some seafoods, if eaten raw, the scientists reported, also may interfere with utilization of thiamin. This is because an enzyme in the fish and seafood destroys the vitamin. Cooking, in turn, destroys the enzyme. So eating raw clams may rob you of all the vitamin B₁, or thiamin, you would get from the rest of your meal, while clams cooked, as in chowder, would not.

The vitamin studies were reported at a joint meeting of the Wisconsin Academy of Sciences, Arts and Letters with four other Wisconsin organizations.

Science News Letter, May 4, 1946

ASTRONOMY

First-Hand Account of Fall of Meteorites

► IF IT HAPPENED now, the cry would be: "Atomic bomb!" When a shower of meteorites was actually witnessed in broad daylight by a large number of Moros in the Philippines in 1938 many believed the end of the world had come.

Just reported scientifically after this lapse of eight years, astronomers are analyzing the unusual story.

Few men have ever had the opportunity of watching "shooting stars" actually fall to earth, and of recovering bits of these visitors from space while still hot from their flight.

But a college-trained man, H. J. Detrick, witnessed the fall of the Pantar, Lanao, Philippine Islands meteorites and talked with natives who were only a few feet from where the aerolites fell.

Sounding like explosions from the exhaust of an airplane, and continuously emitting ringlets of smoke, the fireball sped on its course across the sky, on June 16, 1938, at 8:45 a.m., Mr. Detrick states in his report. Its career ended with terrific explosions and thunderous vibrations that caused doors and windows throughout the town and countryside to rattle. These mighty explosions created a huge gray-and-black cloud, filled with bursts of flame, that spread out in the heavens. The cloud persisted for more than 30 minutes.

At Pantar, immediately beneath these mighty blasts, a number of Moros saw fiery objects with tails of smoke shooting out from the cloud during the terrific blasts. The fiery dots disappeared a short distance from the cloud, but a few seconds later many small objects fell to earth.

"Several galvanized-iron-roofed houses of these Moros were in the zone where small objects, 'as big as corn and rice grains,' fell by the thousands in a great shower—the pattering sounding like hail!" Mr. Detrick reports. Some of the meteorites, falling directly to the ground, sank a foot and a half into the ground. The deepest one, found 20 inches below the surface and smelling like burned gunpowder, was recovered while still hot 10 steps from where the Moros stood.

The detailed account of the phenomena recently reached Dr. H. H. Nininger, director of the American Meteorite Laboratory in Denver, and was published scientifically in the journal, *Popular Astronomy* (April).

Science News Letter, May 4, 1946

PHYSICS

Exploding Atoms

May aid the study of cancer, explain how the green leaf synthesizes food and fuel, and explain just what happens in some of the major industrial processes.

By WATSON DAVIS

► **EXPLODING** atoms, by-products of the atomic bomb, promise to discover some of the world's major scientific secrets. These include how the green leaf synthesizes food and fuel, what makes cancer cells run wild, how the minute cells at the very beginning of a human life know what to do, just what happens in some of the major industrial processes such as cracking oil to obtain gasoline.

The atom bomb is revolutionary and world shaking. The use of artificial radioactive isotopes for tracer and atom tagging experiments in chemistry, physics, biochemistry, and medicine, may be even more world shaking. The new tools which are being used are varieties of chemical elements called isotopes. Carbon 14, a radioactive isotope of the ordinary carbon which composes so much of the world we live in, is now to be had as a by-product of the atomic bomb research. It is made by transmutation of nitrogen 14 bombarded by neutrons.

"A whole vista of opportunity is opened up as the result of the availability of the C-14 isotope," according to Dr. Glenn T. Seaborg, co-discoverer of the bomb element, plutonium, and the newer elements known to chemists as numbers 95 and 96. Professor of chemistry at the University of California, Dr. Seaborg is engaged in atomic research at the Metallurgical Laboratories at the University of Chicago.

"Organic chemists, biochemists, physiologists and the men of medicine," Dr. Seaborg reported to the American Chemical Society meeting at Pittsburgh, "have dreamed for years of the day when a radioactive isotope of carbon suitable for tracer investigation should become available."

The first and most obvious application in organic chemistry for C-14 would, in Dr. Seaborg's opinion, be a study of the rearrangements that take place in organic molecules. "There are a number of reactions," he says, "in which carbon atoms or groups of carbon atoms move from one part of a molecule to another. The question of just how this migration is accomplished has been a subject for discussion among organic chemists for many years. By labelling the migrating groups in certain positions," by introducing radioactive carbon atoms into the molecule, it should be possible to determine the precise sequence of events in such a reaction.

Has Other Isotopes

Carbon, whose normal atomic weight is 12, has other isotopes as well. There is a heavy, stable variety, C-13, which can be detected in compounds by its greater weight. C-13 can also be used to replace C-12, and its ultimate place in the new compound determined.

"Actually these isotopes complement each other," says Dr. Seaborg, "and it is very fortunate that both are available. There now exists the interesting possibility of tagging each of two different carbon atoms in a molecule or system, and then simultaneously observing the course of each."

Still a fourth variety of carbon is

known, C-11, which is radioactive but has a very short period of activity, so that its travels cannot be followed over as long a period as can those of C-14. Nevertheless, Dr. Martin D. Kamen and the late Dr. Samuel Ruben of the University of California, and Prof. William Z. Hassid, formerly of the University of California and now at Washington University, St. Louis, were able to use radioactive C-11 in a study of photosynthesis in which considerable progress was made.

"Radioactive carbon dioxide," states Dr. Seaborg, "was fed to the unicellular green alga *Chlorella* and also to higher plants under various controlled conditions in the light as well as in the dark. The results obtained so far have been rather surprising. The higher plants and the algae reduce carbon dioxide in the dark. This process takes place concurrently with the release of carbon dioxide by respiration, so that the net effect is an evolution of carbon dioxide."

The part of the plant to which the radioactive carbon atoms travelled was examined to try to find the chemical compound into which it had been built in the process of photosynthesis.

"Attempts to identify the radioactive substances formed in the dark and in the light have been thus far unsuccessful. It is of considerable interest to note that formaldehyde, which has played a prominent role in many proposed mechanisms, was not identified from the radioactive carbon dioxide introduced. Experiments with the ultra-centrifuge and diffusion methods indicate the average molecular weight of the radioactive molecules to be about 1,000, which explains the failure to identify chemically these molecules with any small molecules."

Radioactive isotopes of all the chemical elements are now known, and those of several besides carbon are contributing to our newer knowledge of life processes. Hydrogen 3, for example, may be introduced into many organic molecules, and followed through a series of shifts in much the same way as carbon 14, except that it is somewhat more difficult to detect.

"Radiophosphorus has been the most widely used of all the artificially prepared radioelements as a tracer for metabolic studies in biological systems," says Dr. Seaborg. "The distribution of administered phosphorus in human and animal tissues has been extensively studied."



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A single dose of disodium phosphate tagged with radiophosphorus has been found to accumulate to the greatest extent in the bones, next in the muscle and so on in decreasing order in liver, stomach and small intestines, blood, kidneys, heart and least of all in the brain. However, other experiments showed that in cases of leukemia the abnormal tissues accumulated unusual amounts of radiophosphorus. This opens the possibility that cancer may be treated by radioactive elements which concentrate and give out their beneficial rays in the very tissues which the rays are planned to treat.

Concentration of a certain element in one part of the body is well known in the case of iodine, which is absorbed to a large extent by the thyroid gland, even though the absolute amounts of iodine used by the body are extremely minute. Radioactive iodine in an appropriate combination may be swallowed by a patient who has placed a Geiger counter, which detects radioactive rays, near his throat.

The arrival of the jagged atoms of iodine in his thyroid will promptly make itself known on the instrument. The differences in metabolism rate for the various types of thyroid activity characteristic of patients with different thyroid activity are easy to determine by this simple and direct method of measurement.

"An interesting piece of work to the comparative biologist," comments Dr. Seaborg, "was done by Dr. Aubrey Gorbman, of Wayne University, who found in certain invertebrates having no thyroid gland, that iodine is nevertheless concentrated in a marked fashion in a part of the organism whose function was not previously known. It is, therefore, this primitive organ that is probably the predecessor of the thyroid gland in higher animals."

From the utilization of tagged atoms in every-day life processes, the next step is to the migrations of atoms in newly forming embryos. "It is not difficult," says Dr. Seaborg, "to imagine ways in which the use of radioactive tracers will contribute to the solution of fundamental problems in the field of genetics, although some of the concepts are vague at the present time as to the actual planning of the experiments."

"It is evident, for example, that some causal relation must exist between the gene (or genes) for brown eyes, let us say, and the actual deposition of pigment in the cells of the iris. This problem has already been attacked by Dr. George W. Beadle of Stanford Univer-

sity and his associates by classical methods, but the availability of radioactive isotopes should make the solution of the problem much easier.

"Not unrelated to this problem, but in the field of embryology, is the problem of the 'organizer,' the substance or substances responsible for guiding the course of cellular differentiation in the developing embryo. The nature of this substance or substances is only incompletely understood, and its detailed method of action unknown. Here again radioactive tracers may be expected to facilitate the investigation of this problem.

"Radioactive isotopes will also contribute to future advances in investigations dealing with such fundamental problems as the mechanism for the transformation of chemical energy to mechanical movement in living things. Thus, today, no one knows quite what brings about a constriction of a muscle fiber, or even what mechanism is responsible for the movement of an amoeba.

"A possibility, which may sound quite startling, is that of tagging bacteria with radioactive C-14. This does appear to be feasible and to open great possibilities in the study of disease. In fact Prof. Israel Chaikoff and Dr. Alexander Kaplan of the University of California have made a beginning by tagging the tuberculosis bacillus with radioactive phosphorus in some experiments which have not yet been brought to completion.

"Many more possibilities for the use of radioactive isotopes in bio-chemical and physiological work might be suggested, but those given above suggest typical possibilities. Obviously, many of these problems are of profound significance in terms of human welfare."

But the biological field, full of possibilities as it is, is not the only one where the new techniques can bring valuable new information. "With respect to chemical problems of direct interest to industries," says Dr. Seaborg, "many examples could be cited. Among these may be mentioned studies, with C-14, of the mechanism of catalytic cracking, isomerization and alkylation of hydrocarbons which are of profound interest to the oil industry.

"The future," Dr. Seaborg concludes, "seems to hold unlimited possibilities for the application of radioactive tracers to scientific problems. It is certain that the applications of radioactive tracers which have been made so far are just the beginning of what is going to become an extremely large and successful field of research."

Science News Letter, May 4, 1946

CHEMISTRY

Waterproof Felt Hats Retain Shape and Size

► NOW MEN can have waterproof felt hats that retain their shape and size permanently. They look like ordinary felts, but the material is a combination of wool with a plastic fiber that keeps the hat in proper shape and makes it shed water.

The plastic is a vinyon fiber, which is a polyvinyl chloride-acetate made from vinyl resin dissolved in acetone. In the hat-making procedure, it is "set" by a special heat-treatment, and becomes fused with the wool fibers.

While water-repellent under most circumstances, it can be wetted through by thorough soaking, but even then does not lose shape or shrink, it is claimed. It is unaffected in dimensions by the ordinary commercial dry cleaning, steaming and pressing methods.

Science News Letter, May 4, 1946

America has now at least 300 companies packing frozen foods, 40,000 stores selling them, and 2,000,000 families using these fresh fruits, vegetables and other articles of diet.

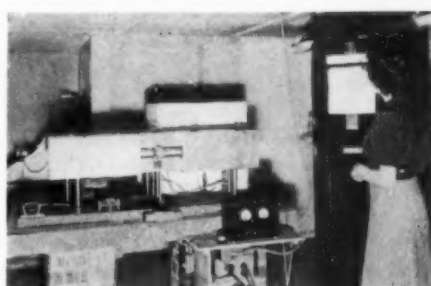


Photo courtesy Ohio State University

CHART INFRA-RED ABSORPTION with SPEEDOMAX

The Speedomax Recorder, L&N's high-speed potentiometer in which the balancing mechanism is electronically controlled, is being used by many labs today to check purity of chemical compounds by infra-red spectrum. It is extremely rapid—pen moves across chart in 1-1/2 seconds. You provide the amplifying link between the Recorder and the radiation receiver of your own spectrometer—thus converting the instrument from spectrometer into spectrograph.

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Do You Know?

When *pruning* plants, it is better to prune too little than too much.

The soft outer shell of unripe *walnuts* is rich in vitamin C.

Chinese soldiers are said to keep *quails* for quail-fighting as a sport.

At one time heat was thought to be a weightless fluid called *calor*.

The *century plant*, which has a flower stalk that may be 30 feet tall, belongs to the same order of plants as lilies.

Pink *oysters* have been shown to be infected with a yeastlike fungus, which indicates that they are not strictly fresh although not necessarily injurious.

The leaves of the *foxglove* are gathered for the making of the drug digitalis when the flowers are about two-thirds opened.

Helicopters seem to have secured a place for themselves in American flying; one company reports an initial order for 500 for its latest model that has been granted a federal commercial license.

Synthetic mica found in Germany by United States investigators is reported by them to be as good as natural mica; it contains mixed oxides, fluorides, and silico-fluorides of aluminum, magnesium, iron, chromium and vanadium.

YOUR HAIR and Its Care

By Oscar L. Levin, M.D.
and Howard T. Behrman, M.D.

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ELECTRONICS-AERONAUTICS

Safer Landings

Will be the result of combining automatic pilot and landing controls. New two-way radio for personal planes will make private flying safer.

► A COMBINATION of electronic automatic pilots and automatic landing controls will help airliners make safer landings under weather conditions now called hazardous. A new two-way radio unit for personal planes, which can utilize the outstanding features of both low frequency and very high frequency airways facilities, will make private flying safer. These are two of the important new developments in the aviation field.

The new electronic automatic pilot is a Sperry device to replace the hydraulic automatic pilot used in the past. These pilots, incorporating automatic airport approach facilities, will soon be installed in transports of the United Air Lines. They are not going to replace human pilots, but they will assist, particularly under poor flying conditions.

In actual operations, pilots approaching an airport will set the equipment to receive localizer radio signals. Fed from a special very high frequency airplane radio receiver into the electronic automatic pilot, these will lead the plane to the airport runway.

At about five miles from the airport, the plane's receiver will begin picking up signals from a glide path transmitter on the airport. These will lead the plane automatically down a beam sloping to a point exactly over the end of the airport runway. The human pilot will take over from the automatic pilot at this point and will make the actual landing.

From the time the airport localizer signals are picked up until the plane is directly over the end of the runway, the entire operation will be automatic, with the electronic pilot doing the work and the human pilot monitoring the automatic approach by watching a cross pointer on the plane's instrument board and by checking the standard instruments. As long as the vertical and the horizontal needles of the cross pointer instrument are at right angles, the plane is on course and is making a proper descent down the glide path to the runway.

At cruising altitudes, the electronic pilot will be used much as are the hydraulic pilots. Its controls will be set to maintain cruising elevation and direction.

The new two-way personal plane radio is a product of Raytheon Manufacturing Company. Transmitter and receiver are combined in a single compact unit, that can be quickly installed or removed. Receiver performance, the makers claim, is comparable to commercial airline standards. Its superheterodyne circuit incorporates a stage of radio frequency amplification providing extremely high sensitivity to weak signals.

The transmitter circuit of the Raytheon radiophone has unusually high output to insure communications over extended ranges and adverse radio conditions. All necessary loading circuits for use on any type aircraft radio antenna are self-contained in the transmitter.

Science News Letter, May 4, 1946

ENGINEERING

Coal Turbine Locomotives To Rival Diesel Engines

► LOCOMOTIVES powered by coal-burning gas turbines, now in the development stage, can match the cost of diesel-fired locomotives, Dr. John I. Yellott of Bituminous Coal Research, Baltimore, told the American Mining Congress in Cincinnati.

Methods have already been perfected; he said, to pulverize the coal to the fineness of talcum powder by means of a simple air-operated coal atomizer, and an equally simple apparatus has been developed for removing the fly ash from the products of combustion.

With this prime mover, powers of 4,000 to 8,000 horsepower in a single cab are expected. The gas turbine will probably cost less than the diesel. It will be able to burn any solid fuel from bituminous coal to lignite, and relieve railroads of any fear of the increasing costs of liquid fuels.

Science News Letter, May 4, 1946

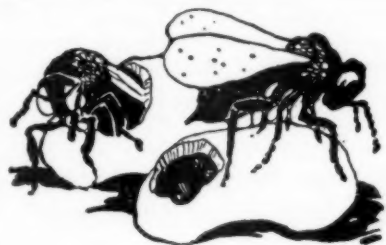
The quill of the condor is probably the stoutest known *feather* of living birds.

High temperature seems necessary for the production of *acacia gum*; in cooler climates the trees flourish but do not yield gum.

ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone



Insect Dietary

► INSECTS turn up practically everywhere you look, and wherever you find them, you are very likely to find them eating. The housewife finds moth larvae chewing up her woolens and furs, ants in the sugar, cockroaches in the garbage-pail, termites in the living-room floor. Her sweating spouse, trying to do his civic duty by raising a garden, has to fight potato beetles, squash bugs, cabbage worms, grasshoppers, Japanese beetles, and others too numerous to mention without profanity, while mosquitoes plague his ankles and deerflies bite his neck. It should take no argument to convince any citizen that insects will eat anything.

How near that comes to being literally true is vividly set forth in a new book, *Insect Dietary*, by the veteran Harvard entomologist, Prof. Charles T. Brues. In contrast to the dainty appetites of bees and butterflies that sip flower nectar is the very curious feeding habit of certain beetles, which causes them to chew up the lead in plumbing and the coverings of electric cables. Nothing is too dry for some insects: you will find borers in dead wood in the middle of any desert. Nothing is too wet for others; the all-liquid diets of all bloodsuckers like mosquitoes and bedbugs, and of sapsuckers like aphids and cicada larvae, are evidence enough.

Insects take what would seem to be awful chances just to get a meal for themselves or their young. Spiders by millions are victims of wasps and other predatory species—which would be a case of cat-eat-dog in the mammalian world. Poisonous plants like death-cup fungi, henbane and poison ivy are chewed up with apparent impunity by some species; in warmer lands insects devour the leaves and stems of the very plants from which insecticides are derived, like pyrethrum and

derris. Even the insectivorous plants, like the pitcher-plants and bladderworts, are invaded by insects that seem to be able to eat without being eaten.

Some of the most interesting of insects, from the viewpoint of their food habits, are found among the midgets of the hexapod world—the tiny wasps and other creatures that are almost too small to see. Their multiform and often highly complex techniques of attaching their eggs to the bodies of their prospective victims, or to their eggs, so that the hatching larvae may become internal parasites, have excited the admiration of naturalists for many years. Some of them add a second parasitic twist: they fasten themselves to the bodies of their prospective victims, and ride as hitch-hikers to the latter's egg-laying site, to save the labor of looking for it themselves.

Science News Letter, May 4, 1946

CHEMISTRY

Relief from Hay Fever By Use of 2,4-D

► HAY FEVERITES whose suffering comes from ragweed pollen may get relief this coming August if communities can apply this summer the latest findings on the weed killer, 2,4-D.

Laying down a fog of 2,4-D on roadsides, empty lots and other ragweed in-

festated areas on the right date is the way to do it, according to studies reported by Drs. Frederick G. Smith, Charles M. Hamner and Robert F. Carlson of the New York State Agricultural Experiment Station at Geneva, N. Y., and Cornell University. Their findings are reported in *Science* (April 19).

In the first tests, ragweed plants sprayed with 2,4-D on July 26 were either dead or dying on Aug. 23 without having shed any pollen. Unsprayed plants had developed normally and on that date were shedding pollen as usual. The weed killer should be used at a very early stage of flower development which botanists would recognize as being before the involucre are open.

Equally good results were obtained when the scientists used a fog machine to apply the weed killer instead of spraying it on. The fog machine method promises to be more practical because of lower cost in equipment, swifter application and avoiding the use of large volumes of water.

Other advantages of 2,4-D for ragweed control are that it is relatively non-poisonous and acts on the weeds rather than on grasses.

Science News Letter, May 4, 1946

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Books of the Week

CHEMISTRY OF FOOD AND NUTRITION—Henry C. Sherman—*Macmillan*, 675 p., tables and illus., \$3.75, 7th ed. The principles of food chemistry and nutrition with as many of the scientific facts as are deemed important for an effective grasp of the subject; a textbook designed to meet the needs of college students, but which will also be of service to other readers. A new edition containing recent advances.

COSMETICS AND DERMATITIS—Louis Schwartz, M.D. and Samuel M. Peck, M.D. *Hoebner*, 189 p., tables and illus., \$4. A survey of modern cosmetics and their effects on the skin; an important neglected subject is helpfully handled here by two authorities.

DOCTORS EAST, DOCTORS WEST: An American Physician's Life in China—Edward H. Hume, M.D.—*Norton*, 278 p., illus., \$3. Dr. Hume's personal record of building a medical center in Changsha, China, where Chinese and Americans worked side by side in the pursuit and application of medical knowledge.

EVOLUTION OF PLASTIC SURGERY—Maxwell Maltz, M.D.—*Froben Press*, 368 p., illus., \$5. A history, covering the entire field, from the Stone Age to the most recent surgical developments.

EXPERIMENT IN GERMANY: The Story of an American Intelligence Officer—Saul K. Padover—*Duell*, 400 p., \$3.75. A unique story of Dr. Padover's experience as an OSS agent in Germany, where it was his

job to investigate the state of mind of an enemy nation at war.

THE HOW OF THE HELICOPTER—Alfred H. Stevens, Jr.—*Cornell Maritime Press*, 58 p., illus., \$2. How helicopters were invented; how they fly; how they are flown; how they are used today and may be used tomorrow. Text and drawings for teenagers.

KEYS TO THE COMMON FLESHY FUNGI—Clyde M. Christiansen—*Burgess*, 45 p., illus., paper, \$1.50. Designed to be helpful to beginners, amateur and professional, who plan to work in the field alone.

LABOR IN THE PHILIPPINE ECONOMY—Kenneth K. Kurihara—*Stanford Univ. Press*, 97 p., tables and illus., \$2. An examination of the task remaining to be done in furthering the welfare of the Philippine people, as a step toward the economic reconstruction of the Philippine Islands. Issued under the auspices of the American Council Institute of Pacific Relations.

MODERN PRACTICAL ACCOUNTING: Elementary—Earl A. Saliers—*American Technical Society*, 365 p., illus., \$4. An introduction to the basic principles which underlie all accounting procedures.

OHIO STATE AND OCCUPATIONS—Occupational Opportunities Service, Ohio State Univ.—*Ohio State Univ. Press*, 198 p., paper, \$1.50. A collection of brief descriptions of occupations open to college graduates, classified according to curricula or college major.

OUR TREES: How to Know Them—Arthur I. Emerson and Clarence M. Weed—*Lippincott*, 295 p., illus., \$3, 5th ed. Photographs from nature, with a guide to the recognition of trees at any season of the year and notes on their characteristics, distribution, and culture.

RUBBER RED BOOK: Directory of the Rubber Industry—*The Rubber Age*, 691 p., illus., \$5.

SCIENCE, LIBERTY AND PEACE—Aldous Huxley—*Harper*, 86 p., \$1. A thoughtful analysis of the individual today and his future in the world.

SCIENCE YEAR BOOK OF 1946—J. D. Ratcliff, ed.—*Doubleday*, 245 p., \$2.50. A collection of essays on progress during the war years in the fields of physics and chemistry, medicine, agriculture, aviation and other sciences.

STRANGE CUSTOMS, MANNERS AND BELIEFS—A. Hyatt Verrill—*L. C. Page*, 302 p., illus., \$3.75. Unique stories of taboos, charms and fetishes, deadly savage weapons, primitive games and musical instruments, odd marriage rites, burial customs, and many other curious viewpoints and practices of man.

THIS IS THE PEACE—Violet Anderson, ed.—*Bruce Humphries*, 118 p., paper, \$1.75. Addresses given at the Canadian Institute on Public Affairs, August 18 to 25, 1945.

TREES FOR AMERICA—*American Forest Products Industries, Inc.*, tables, paper, free. A report of the tree-growing conference in New York on March 1, 1946,

sponsored by the American Forest Products Industries; an outline of the objectives of this program and the means by which these objectives may be reached.

UNHAPPY MARRIAGE AND DIVORCE—Edmund Bergler, M.D.—*International Universities Press*, 167 p., \$2.50. A psychoanalytic study of neurotic choice of marriage partners.

Science News Letter, May 4, 1946

PUBLIC HEALTH

Civilian Amputees Need Rehabilitation Programs

➤ REHABILITATION programs are needed for civilian amputees no less than for salvaged battle casualties, members of the American Philosophical Society were told by a physician-journalist, Dr. Howard A. Rusk, associate editor of the New York Times. As a colonel in the Army Air Force during the war, Dr. Rusk set up the first rehabilitation program for disabled fighters and thus initiated a movement that has been highly successful.

"Few Americans realize that for every disabled soldier there are scores of equally or more severely handicapped civilians," Dr. Rusk declared. "From Pearl Harbor to V-J Day there were approxi-



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mately seventeen thousand amputations in the Army, but during that same period there were over 120,000 major amputations from disease and accidents among our civilian population. Each year over 350,000 Americans become permanently disabled by accident alone."

That physically handicapped persons are anything but human wreckage was decisively demonstrated during the war, the speaker indicated. Then, because of manpower shortage, many thousands of them got jobs that had previously been denied them. They showed themselves competent, and had a lower absentee record than that of their more fortunate brethren at the same benches.

Dr. Rusk called for a comprehensive program of rehabilitation for handicapped civilians:

"Funds and authority for bringing comparable opportunity to America's civilian handicapped are available, but there are not sufficient facilities with trained personnel, experience and equipment to do the actual work.

"Preventive medicine and curative medicine and surgery have made great advances. The third phase of medical care—rehabilitation and convalescence care—must be expanded to bridge the gap now existent from the bed to the job and normal activity."

Science News Letter, May 4, 1946

GENERAL SCIENCE

Science-Government Cooperation Praised

► HERE'S ANOTHER great war-science achievement that ranks with the atomic bomb and the proximity fuze:

"A working relationship between central government and highly qualified scientific and technical people" which makes possible the discoveries.

This wartime cooperation must con-

tinue for the development of science in peacetime, Dr. M. L. Tuve, head of the department of terrestrial magnetism of the Carnegie Institution of Washington and former director of one section of the proximity fuze project, told the National Academy of Sciences meeting.

Describing the organization that produced the fuze, termed America's No. 2 secret weapon, Dr. Tuve declared that the important thing we learned during the war is the need during peace for this mechanism.

Far more than our military establishments is involved, Dr. Tuve said. The Office of Scientific Research and Development contract program, he cited, showed how specifically qualified individuals as a whole participate effectively in decisions and actions of the national government without losing their diversity of status and viewpoint as members of the general civilian community outside of the government.

Science News Letter, May 4, 1946

GENERAL SCIENCE

Atomic Scientists Among Guggenheim Winners

► FIVE ATOMIC scientists are among the 132 persons receiving fellowship awards totalling \$360,000, the John Simon Guggenheim Memorial Foundation has announced.

Japanese-born Dr. Shuichi Kusaka, a U. S. Army pfc., is one of the winners. Dr. Kusaka plans to work with Dr. J. Robert Oppenheimer at the California Institute of Technology and with Dr. Wolfgang Pauli of the Institute for Advanced Study, Princeton, N. J.

Other atomic scientists receiving Guggenheim Fellowships are Dr. William George McMillan, Jr., Institute of Atomic Physics, University of Chicago, who worked on the Manhattan District; Dr. Robert L. Platzman, Metallurgical Laboratory, University of Chicago, who plans to work with Prof. Niels Bohr at the University of Copenhagen, Copenhagen, Denmark; Dr. James Alfred Van Allen, research physicist at Johns Hopkins University, who will go to the University of California, Berkeley, Calif.; and Dr. Wayne Eskett Hazen, University of California.

Dr. Hazen will make a study of cosmic rays at extremely high altitudes in unmanned balloon flights and in high altitude airplane flights, the Foundation reported.

Forty-one other scientists are among the fellowship winners.

Science News Letter, May 4, 1946

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✿ **EYE TRAINER**, for developing accurate split-second seeing, is a box with a screen on which numbers are flashed before a trainee at exposures ranging from one second to 1/400 of a second. The trainee is started with four-digit numbers, but as perception improves, is given longer numbers at shorter exposures.

Science News Letter, May 4, 1946

✿ **VEST-POCKET** slide rule, circular in shape, has an outer scale, an inner scale and a "finder". It gives the square root, the logarithm and reciprocals of all numbers; "trig" scales give the sines and tangents of numbers. It is made of a nearly unbreakable plastic.

Science News Letter, May 4, 1946

✿ **POCKET** adding machine, the size and shape of a fountain pen and with a pencil point if desired, has on its cylindrical barrel a series of identical number wheel units which may be revolved with the fingers. Through gears these operate the mechanism that performs the addition and gives the proper answer.

Science News Letter, May 4, 1946

✿ **FEATHERWEIGHT** material, of great strength beneath a mirror-like exterior, has been developed for use in aircraft construction. It is made of two thin sheets of aluminum bonded to a sepa-



rating core of balsa wood. The smoothness of its finish is indicated by the reflection in the picture.

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✿ **RADIO RECEIVER** not only picks up ordinary programs but also can be used to talk to someone with a similar receiver in another room. It is merely plugged into the nearest electric light socket, and operates on the principle of carrier-currents. Each instrument in use

becomes a radio-frequency transmitting station.

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✿ **TIRE TRACKS**, to put under automobile wheels in mud or snow, are made of hinged steel pieces with non-slip tractive surfaces, and may be folded when not in use. When open they make a track 50 inches long and 12 inches wide.

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✿ **COLD STARTING** fuel for aircraft operating in subzero temperature slices the time required for preparation and starting to about two minutes. It is made from the low-boiling fractions of gasoline and is used in the regular aviation carburetor and priming system during the starting period only.

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Question Box

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